Keeping Pace with Nanotechnology

Environmental and Public Health Accountability in a Rapidly Evolving Industry

The Challenge

- Designing an environmental governance system that is capable of
  - (1) identifying and avoiding adverse consequences of a rapidly advancing industry,
  - (2) maintaining public confidence in the industry, and
  - (3) facilitating, or at least not unnecessarily inhibiting the growth of potentially transformative technologies.

United Kingdom's Strategy

- "The field of nanotechnology and its applications is crucial to the future competitiveness and productivity of the UK economy, and to the well being and prosperity of its people."

Why a Different Approach to Accountability?

- rapid evolution of the technologies,
- the anticipated industry growth rate,
- Scarce government resources
- the massive investments in nanotechnology research and development (both by companies and by countries),
- and the almost visceral sense that no country and no company wants to be left behind in the nanotechnology revolution.

A Governance System

- Traditional regulatory tools
- Newer tools including
  - robust public involvement and public dialogue, expanded information disclosure that safeguards confidential business data,
  - involvement in government and industry leadership programs,
  - a liability system that checks irresponsible behavior,
  - effective self-regulation mechanisms and adherence to clear and effective industry codes.

The Woodrow Wilson Institute

- The rapid development of NT means that government managers always will be operating with outdated information, and data on NT effects will lag behind commercial applications. Priorities for research and for regulation will need to shift constantly.

Government Can't Keep Pace

- We have moved into a world which is, as David Rejeski states, "dominated by rapid improvements in products, processes, and organizations, all moving at rates that exceed the ability of our traditional governing institutions to adapt or shape outcomes."

The Dilemma

- Using a 20th century approach to environmental and health regulation designed to deal with 19th century industries to manage 21st century technologies

Behavioral Drivers

- Regulatory System
- Economics
- Ethics/Values

Government Regulation

- Government regulation must be part of the accountability system
- Unlikely that major new legislation addressing nanotechnology will be adopted in the U.S. in the foreseeable future absent a dramatic incident involving nanomaterials

Regulatory Programs must Remain a Part of the System

- Regulatory systems
  - Promote appropriate behavior and drive pollution prevention efforts
  - Deter and, if needed, punish wrongdoing,
  - Build public confidence

SEER and ELI Conclusions

- The existing environmental statutes are useful, but imprecise, mechanisms for dealing with various aspects of several nanotechnologies. Regulation of nanotechnology, given the rapid changes within the industry, is likely to be an ongoing process, with approaches evolving over time

EPA White Paper on Nanotechnology

- Pollution prevention is a critical area to engage EPA resources and expertise as nanotechnology industries form and develop. It is critical that EPA apply the principles of green chemistry, green engineering, and environmentally benign manufacturing in EPA's approach to nanotechnology.

EPA

- EPA has the opportunity to work with stakeholders to apply approaches of pollution prevention and product stewardship to nanotechnology development, so that emissions and risks are reduced as productivity and the economy grow

Public Involvement

- Public confidence is primarily an issue of values, and of political and economic power.
- The specter of unfounded public rejection suggests that accountability tools must be identified that create public confidence in the industry.

Public Confidence Controversies

- The Alphabet Controversies
- BGH and GMOs
- Nanotechnologies face a similar risk

Nanotechnology Backlash Potential

- The level of uncertainty about the effects of some nanotechnologies,
- The fact the public knows little about nanotechnologies,
- The lack of a clear management approach that can allay public concerns,
- The potentially health and environmental effects of some nanomaterials

Risk of Public Rejection

- As Professor Gregory Mandel “individuals and interest groups do not revise their technology preferences in response to scientific and empirical information in the manner that such information appears to indicate.”

Risk of Rejection

- Mandel— “tendency of individuals to rapidly and automatically have a positive or negative feeling when confronted with certain ideas or concepts leads individuals to discount information that conflicts with their perception of risks, and group dynamics that tend to perpetuate and reinforce polarization among individuals who socialize with those holding similar views.”

Moderate Voices

- Moderate voices tend to be underrepresented in debates involving technological risk because moderate voices typically do not inspire a “moderate movement.”

Constructive Contact to Build Confidence

- Mandel--“dialogue and deliberation” in which representatives of all of the interest groups (including “moderates”)
- “The goal of the dialogue would be to help different groups learn about each other and each other’s views, with a goal of accommodation and understanding.

The Royal Society

- The Royal Society and Royal Academy of Engineering issued a similar call for public dialogue and debate in 2004

NGO View

- The Natural Resource Defense Council and Environment Defense have called upon both government and industry to do a better job of "engaging the broad array of stakeholders outside government and industry—labor, health organizations, consumer advocates and environmental NGOs—whose constituencies stand to be both beneficiaries of this new technology and those most likely to bear any risks that arise.

Models

- One model is a company-by-company dialogue, similar to the collaboration between Environmental Defense and Dupont, designed to create a framework for the responsible development, production, use and disposal of nano-scale materials.
- Another approach is a government convened, ongoing dialogue among major stakeholders similar to the process EPA developed used in its Common Sense Initiative in the mid-1990s
- Third Party facilitated dialogue

Conclusion

- An interactive, inclusive, well-informed public dialogue is an essential part of accountability and a core element to avoiding problems such as those that arose with biotechnology.

Voluntary Programs

- Industry leadership programs can play an important part in environmental accountability.
- The incentives for participating in these programs may include public recognition, improved working relationships with government agencies, penalty avoidance through auditing and self-reporting, and regulatory flexibility.

Models

- OSHA's Star Program
- EPA's Performance Track, Energy Star and Green Chemistry Programs
- The Green Tier in Wisconsin and the Clean Corporate Citizen program in Michigan

NGO Concerns

- Some NGOs have historically expressed concerns that leadership programs
- They can be resource intensive, diverting government resources away from other important efforts such as strengthening inspection and enforcement efforts.
- Some NGOs feel that leadership programs do not focus on priority environmental problems.

Recommendation

- A voluntary program that is well designed with broad stakeholder involvement and that is transparent could be an important element of an overall accountability system for nanotechnologies

Liability

- Nanotechnologies will face the threat of legal liability under nuisance, negligence or strict liability theories if their use causes harm to public health or the environment.
- The potential for civil liability is a key element of accountability because government resources to deal with environmental problems are shrinking at the same time as environmental threats are increasing.

Liability

- The civil liability system plays a critical role in tempering corporate decisions to introduce potentially risky products into the market prematurely.
- Liability can be mitigated by a robust regulatory regime
- The risks of civil liability can also be minimized by increased transparency.

Liability

- First, the prospect of disclosure can provide the impetus for a company to modify its product, withhold or temporarily remove it from the market until the impact can be better understood or encourage clearer warnings to the public.
- Second, disclosure can prompt regulatory action including additional studies, product warnings or market restrictions.

Liability

- Third, disclosure allows consumers to make more informed choices in the use of a product.

Conclusion

- The prospect of liability for harm to public health or the environment will be an important accountability tool for the nanotechnology industry.
- But, equally important, the industry has the opportunity to minimize that liability by employing accountability mechanisms such as public reporting and early public involvement.

Industry Codes

- Industries have increasing turned to codes of conduct and industry self-regulation as means of
  - assuring compliance with environmental laws,
  - maintaining their reputation,
  - reducing the risk of legal liability,
  - enhancing relationships with government agencies,
  - minimizing exposure to penalties and
  - building public confidence.

Models

- Coalition for Environmental Responsible Economies (CERES) and its CERES Principles adopted in response to the Exxon Valdez disaster. The American Chemistry Society (then the Chemical Manufacturers Association) adopted its Responsible Care© FSC
- ISO 14001--EMS

NGO Views

- Both the Natural Resource Defense Council and Environmental Defense have recognized the importance of corporate standards of care.

NGO View

Even under the most optimistic scenario, it appears unlikely that federal agencies will put into place adequate standards for nanomaterials quickly enough to address the materials now entering or poised to enter the market. Out of enlightened self-interest, industry must take the lead in evaluating and managing nanomaterial risks for the near term, working with other stakeholders to quickly establish and implement life cycle-based "standards of care" for nanomaterials.

An Accountability "System"

- Traditional regulatory systems are complex to develop and manage; a more inclusive environmental accountability system is likely to be even more complex to oversee.
- Government "controls" the regulatory system. It can only influence many of the other accountability tools.

An Accountability System

- Environmental accountability, especially in the context of nanotechnology, will require a new governance approach; an approach that involves government since government plays a critical role in accountability, but also engages industry and the public in a new management partnership.

A Systems Approach

- While each of these mechanisms can enhance public accountability for environmental outcomes, it is critical that they be thought about, and where possible, deployed in a systematic way.

Conclusion

- A multi-stakeholder Nanotechnology Council could serve this function.
- The Council could be independently chartered or could be organized by government under FACA.

Conclusion

- The Council should utilize facilitated dialogue provided by a highly credible mediation/facilitation organization to identify the parties that should be at the table, the issues that are discussed by the council, the form of deliberation, and communication links to stakeholder organizations and to stakeholders that are not at the table.

Conclusion

- Issues
  - public education
  - additional mechanisms for public dialogue
  - research priorities
  - risk/benefit identification and communications, and
  - regulatory approaches.

Conclusion

- Dialogues engage surrogates for the general public
- it is also important to find ways to engage interested members of the general public directly.
- Better public education is an important element of a new public dialogue on nanotechnology--genuine two-way engagement among scientists, stakeholders and the public.

Conclusion

- The public dialogue could start with a web site on which the best and most credible information on the developments in nanotechnology is regularly posted.
- This should include up-to-date information on both the risks and benefits of nanotechnologies, information about developments in government regulations, and information about industry standards and self-regulation approaches.